Changes for the Better

MITSUBISHI ELECTRIC

Air-Conditioners For Building Application

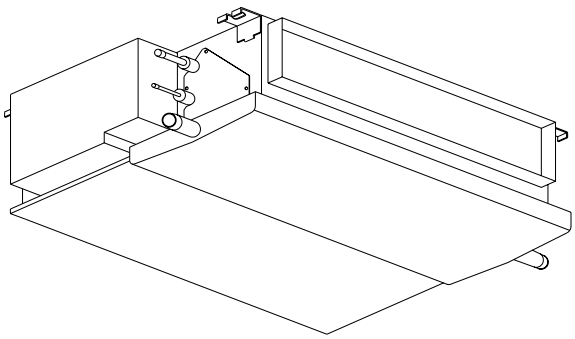
2005

TECHNICAL & SERVICE MANUAL

Series PEFY Ceiling Concealed

<Indoor unit>

Models **PEFY-P06NMLU-E**
PEFY-P08NMLU-E
PEFY-P12NMLU-E



INDOOR UNIT

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CITY MULTI

For use with the R410A & R22

SAFETY PRECAUTIONS

1. Before installation and electric work

- **Before installing the unit, make sure you read all the "Safety precautions".**
- **The "Safety precautions" provide very important points regarding safety. Make sure you follow them.**
- **This equipment may cause the adverse effect on the same supply system.**
- **Please report to or take consent by the supply authority before connection to the system.**

Symbols used in the text

⚠Warning:
Describes precautions that should be observed to prevent danger of injury or death to the user.

⚠Caution:
Describes precautions that should be observed to prevent damage to the unit.

Symbols used in the illustrations

: Indicates an action that must be avoided.

: Indicates that important instructions must be followed.

: Indicates a part which must be grounded.

: Indicates that caution should be taken with rotating parts. (This symbol is displayed on the main unit label.) <Color: Yellow>

: Beware of electric shock (This symbol is displayed on the main unit label.) <Color: Yellow>

⚠Warning:
Carefully read the labels affixed to the main unit.

⚠Warning:

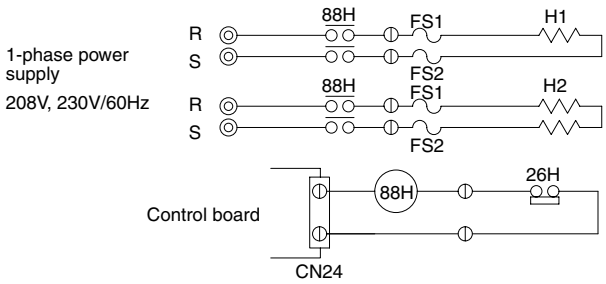
- **Ask the dealer or an authorized technician to install the air conditioner.**
  - Improper installation by the user may result in water leakage, electric shock, or fire.
- **Install the air unit at a place that can withstand its weight.**
  - Inadequate strength may cause the unit to fall down, resulting in injuries.
- **Use the specified cables for wiring. Make the connections securely so that the outside force of the cable is not applied to the terminals.**
  - Inadequate connection and fastening may generate heat and cause a fire.
- **Prepare for typhoons and other strong winds and earthquakes and install the unit at the specified place.**
  - Improper installation may cause the unit to topple and result in injury.
- **Always use an air cleaner, humidifier, electric heater, and other accessories specified by Mitsubishi Electric.**
  - Ask an authorized technician to install the accessories. Improper installation by the user may result in water leakage, electric shock, or fire.
- **Never repair the unit. If the air conditioner must be repaired, consult the dealer.**
  - If the unit is repaired improperly, water leakage, electric shock, or fire may result.
- **Do not touch the heat exchanger fins.**
  - Improper handling may result in injury.
- **If refrigerant gas leaks during installation work, ventilate the room.**
  - If the refrigerant gas comes into contact with a flame, poisonous gases will be released.
- **Install the air conditioner according to this Installation Manual.**
  - If the unit is installed improperly, water leakage, electric shock, or fire may result.
- **Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations"and the instructions given in this manual and always use a special circuit.**
  - If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result.
- **Keep the electric parts away from water (washing water etc.).**
  - It might result in electric shock, catching fire or smoke.
- **Securely install the cover of control box and the panel.**
  - If the cover and panel are not installed properly,dust or water may enter the outdoor unit and fire or electric shock may result.
- **When installing and moving the air conditioner to another site, do not charge the it with a refrigerant different from the refrigerant specified on the unit.**
  - If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.
- **If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit even if the refrigerant should leak.**
  - Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, hazards due to lack of oxygen in the room could result.
- **When moving and reinstalling the air conditioner, consult the dealer or an authorized technician.**
  - If the air conditioner is installed improperly, water leakage, electric shock, or fire may result.
- **After completing installation work, make sure that refrigerant gas is not leaking.**
  - If the refrigerant gas leaks and is exposed to a fan heater, stove, oven, or other heat source, it may generate noxious gases.
- **Do not reconstruct or change the settings of the protection devices.**
  - If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by Mitsubishi Electric are used, fire or explosion may result.
- **To dispose of this product, consult your dealer.**
- **Do not use a leak detection additive.**

⚠ Warning:

- **Note the following when building a heater in the air conditioning system.**
  - Leave enough space between units for proper ventilation so that the indoor unit temperature does not exceed 40˚C when windless.
  - Keep the heater clean, and take appropriate measures so that the indoor unit does not suck in the dust particles that accumulate on the heater.
  - Use the optional heater cable (PAC-YU24HT) to perform an interlocked operation with indoor units.
  - Do not build a heater inside the indoor unit.

Recommended circuit

Wiring diagram



FS1, 2 ----- Thermal fuse

H1, H2 ----- Heater

26H --------- Overheat protection thermostat

88H --------- Electromagnetic contactor

2. Precautions for devices that use R410A refrigerant

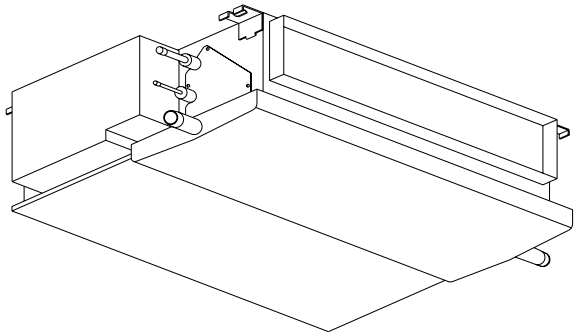
⚠ Caution:

- **Do not use the existing refrigerant piping.**
  - The old refrigerant and refrigerator oil in the existing piping contains a large amount of chlorine which may cause the refrigerator oil of the new unit to deteriorate.
- **Use refrigerant piping made of C1220 (Cu-DHP) phosphorus deoxidized copper as specified in the *JIS H3300 "Copper and copper alloy seamless pipes and tubes". In addition, be sure that the inner and outer surfaces of the pipes are clean and free of hazardous sulphur, oxides, dust/dirt, shaving particles, oils, moisture, or any other contaminant.**
  - Contaminants on the inside of the refrigerant piping may cause the refrigerant residual oil to deteriorate.

  *JIS: Japanese Industrial Standard
- **Store the piping to be used during installation indoors and keep both ends of the piping sealed until just before brazing. (Store elbows and other joints in a plastic bag.)**
  - If dust, dirt, or water enters the refrigerant cycle, deterioration of the oil and compressor trouble may result.
- **Use ester oil, ether oil or alkylbenzene (small amount) as the refrigerator oil to coat flares and flange connections.**
  - The refrigerator oil will degrade if it is mixed with a large amount of mineral oil.
- **Use liquid refrigerant to fill the system.**
  - If gas refrigerant is used to seal the system, the composition of the refrigerant in the cylinder will change and performance may drop.
- **Do not use a refrigerant other than R410A.**
  - If another refrigerant (R22, etc.) is used, the chlorine in the refrigerant may cause the refrigerator oil to deteriorate.
- **Use a vacuum pump with a reverse flow check valve.**
  - The vacuum pump oil may flow back into the refrigerant cycle and cause the refrigerator oil to deteriorate.
- **Do not use the following tools that are used with conventional refrigerants.**
  (Gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, refrigerant recovery equipment)
  - If the conventional refrigerant and refrigerator oil are mixed in the R410A, the refrigerant may deteriorated.
  - If water is mixed in the R410A, the refrigerator oil may deteriorate.
  - Since R410A does not contain any chlorine, gas leak detectors for conventional refrigerants will not react to it.
- **Do not use a charging cylinder.**
  - Using a charging cylinder may cause the refrigerant to deteriorate.
- **Be especially careful when managing the tools.**
  - If dust, dirt, or water gets in the refrigerant cycle, the refrigerant may deteriorate.

1 FEATURES

Series PEFY Ceiling Concealed

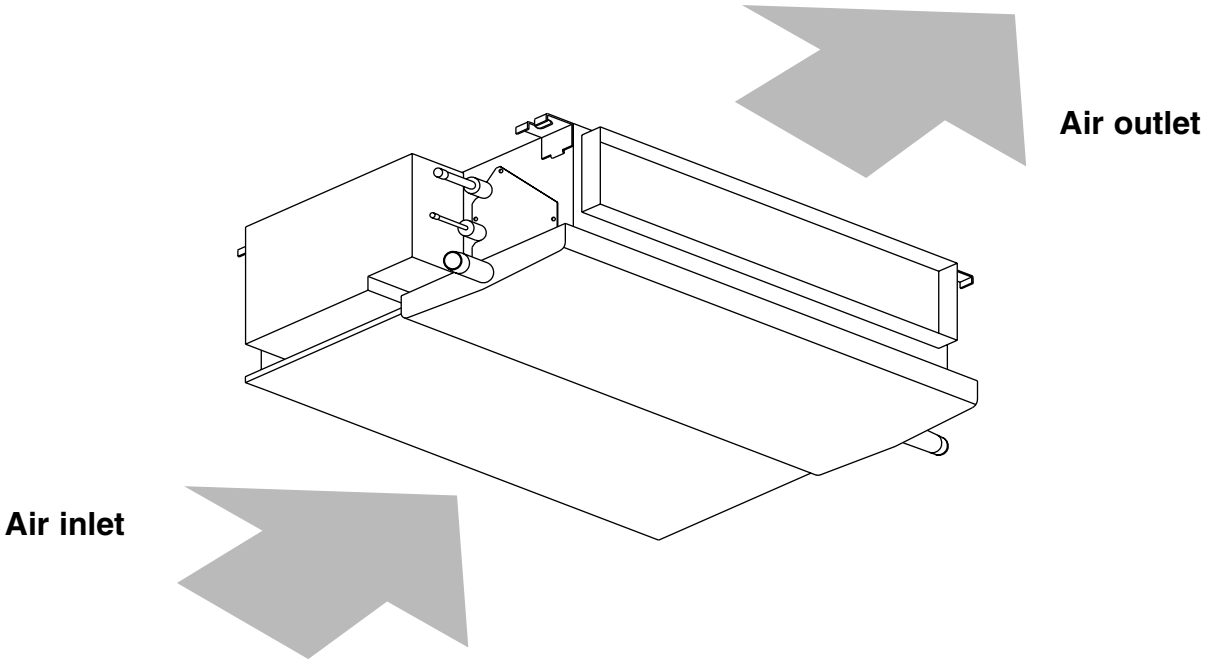


Indoor unit

Models	Cooling capacity/Heating capacity	
	kW	BTU / h
PEFY-P06NMLU-E	1.8 / 2.0	6000 / 6700
PEFY-P08NMLU-E	2.3 / 2.6	8000 / 9000
PEFY-P12NMLU-E	3.5 / 4.0	12000 / 13500

2 PART NAMES AND FUNCTIONS

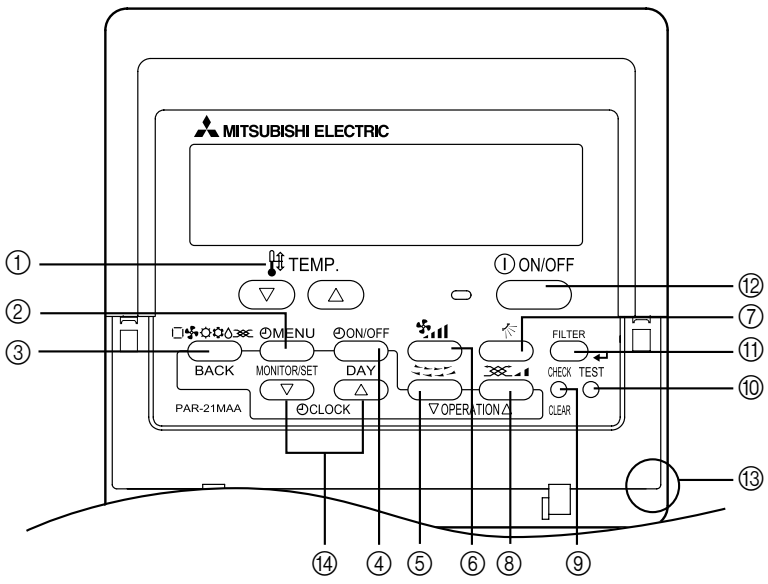
● **Indoor (Main) Unit**



● **Remote controller** **[PAR-21MAA]**

● Once the controls are set, the same operation mode can be repeated by simply pressing the ON/OFF button.

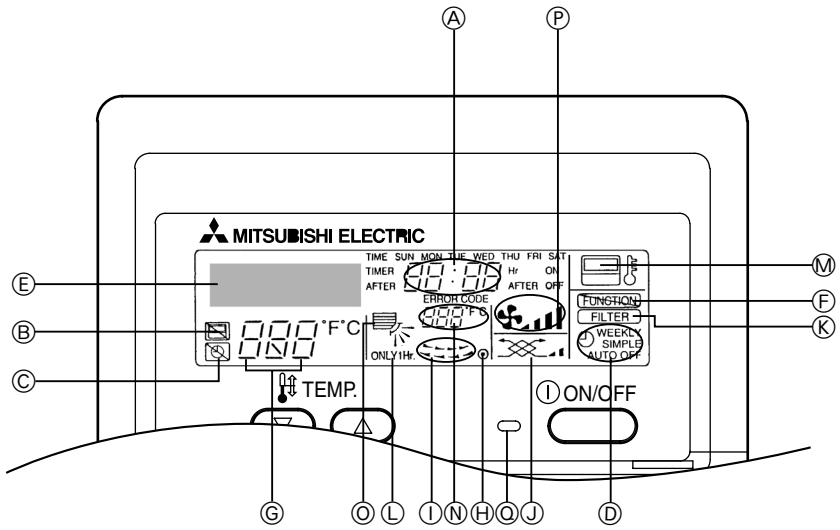
[Operation buttons]



① [Set Temperature] Button
② [Timer Menu] Button
[Monitor/Set] Button
③ [Mode] Button
[Return] Button
④ [Timer On/Off] Button
[Set Day] Button
⑤ [Louver] Button
[Operation] Button
⑥ [Fan Speed] Button
⑦ [Airflow Up/Down] Button
⑧ [Ventilation] Button
[Operation] Button
⑨ [Check/Clear] Button
⑩ [Test run] Button
⑪ [Filter] Button
[↵] Button
⑫ [ON/OFF] Button
⑬ Position of built-in room temperature
⑭ [Set Time] Button

- Never expose the remote controller to direct sunlight. Doing so can result in the erroneous measurement of room temperature.
- Never place any obstacle around the lower right-hand section of the remote controller. Doing so can result in the erroneous measurement of room temperature.

[Display]



Ⓐ Current time/Timer
Ⓑ Centralized control
Ⓒ Timer OFF
Ⓓ Timer indicator
Ⓔ Operation mode: ☼COOL, ♢DRY, ⎕AUTO, FAN, ☼HEAT
Ⓕ “Locked” indicator
Ⓖ Set temperature
Ⓗ Power ON
Ⓘ Louver
Ⓙ Ventilation
Ⓚ Filter sign
Ⓛ Set effective for 1 hr.
Ⓜ Sensor position
Ⓝ Room temperature
Ⓞ Airflow
Ⓟ Fan speed

3 SPECIFICATION

3-1. Specification

PEFY-P-NMLU-E

Item \ Model				PEFY-P06NMLU-E	PEFY-P08NMLU-E	PEFY-P12NMLU-E
Power sourse				208/230V, 60Hz		
Capacity *1	Cooling	kW		1.8	2.3	3.5
		BTU/h		6000	8000	12000
	Heating	kW		2.0	2.6	4.0
		BTU/h		6700	9000	13500
Dimension	Height	mm		225		
		in		8-7/8		
	Width	mm		790		
		in		31-1/8		
	Depth	mm		550		
		in		21-21/32		
Net weight		kg		18		
		lb		40		
FAN	Airflow rate (Low-Middle-High)		m^3/min	4.8-5.8-7.9	4.8-5.8-7.9	4.8-5.8-9.5
			cfm	169-205-279	169-205-279	169-205-335
	External static pressure	Pa	208V	5	5	5
			230V	5	5	5
Noise level (Low-Middle-High) *2		dB(A)	208V	25-29-36	25-29-36	25-29-40
			230V	25-29-36	25-29-36	25-29-40
Filter				Standard filter		

Notes: *1 Cooling/Heating capacity indicates the maximum value at operation under the following condition.
Cooling: Indoor: 26.7 °C [80 °F] DB/19.4 °C [67 °F] WB Outdoor: 35 °C [95 °F] DB
Heating: Indoor: 21.1 °C [70 °F] DB Outdoor: 8.3 °C [47 °F] DB/6.1 °C [43 °F] WB
*2 The operating noise is the data that was obtained in an anechoic room.

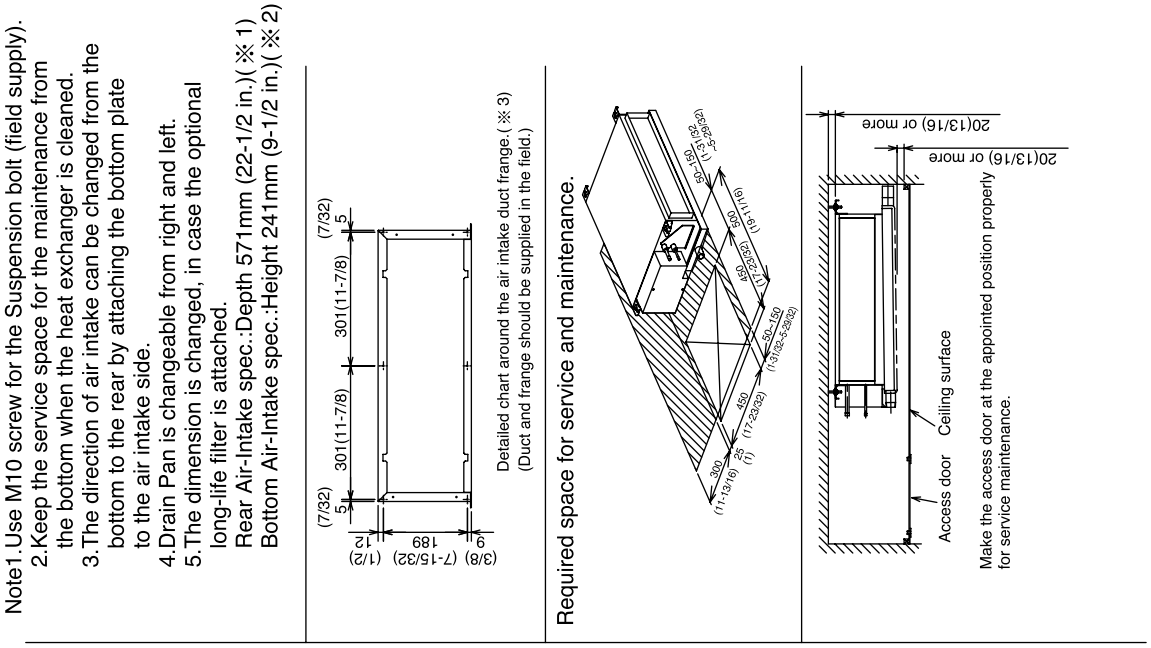
3-2. Electrical parts specifications

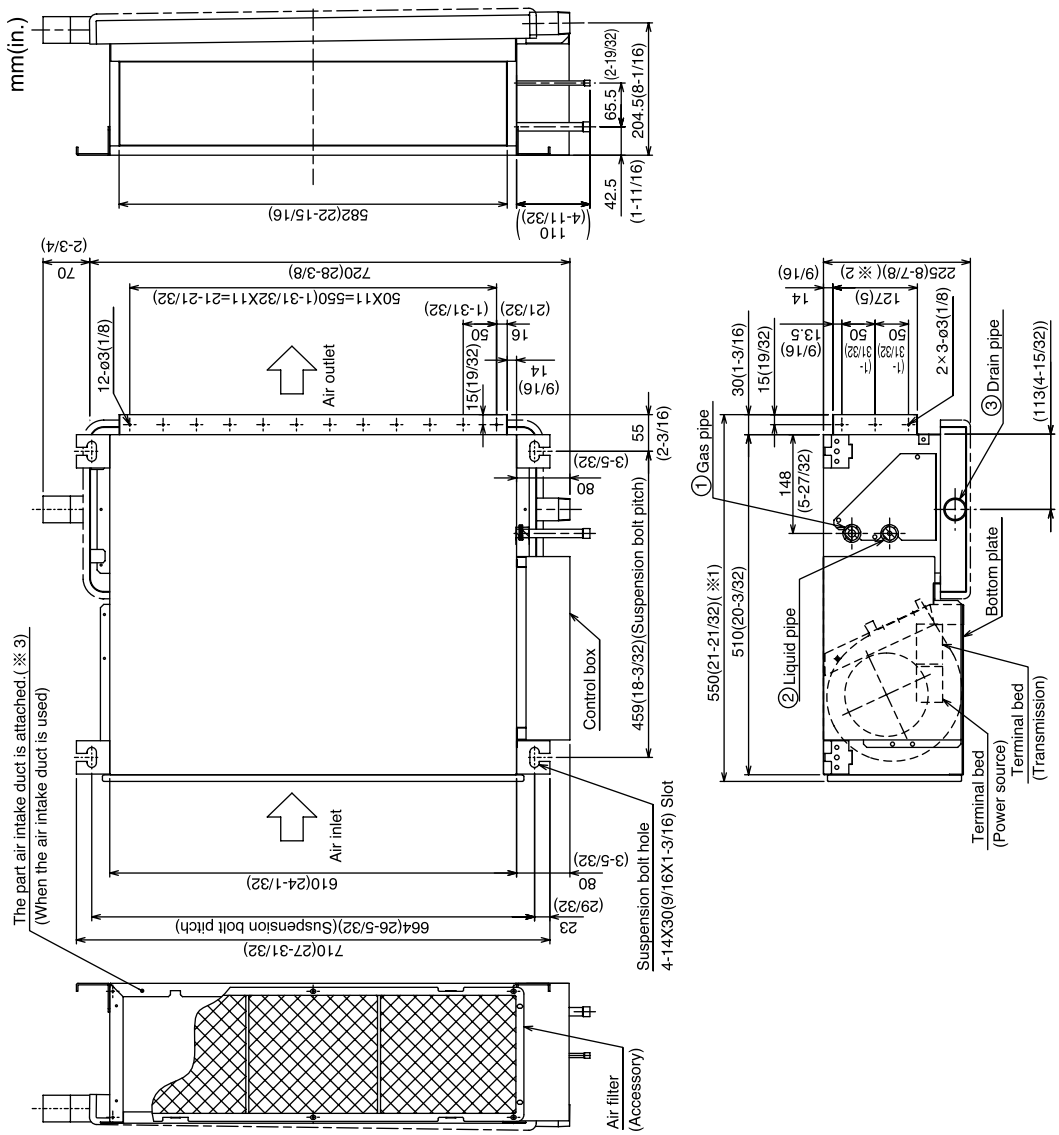
Parts name \ Model	Symbol	PEFY-P06NMLU-E	PEFY-P08NMLU-E	PEFY-P12NMLU-E
Tranrsformer	T	(Primary) 50/60Hz 220-240V (Secondry) (23.5V 0.9A)		
Room temperature thermistor	TH21	Resistance 0˚C[32˚F]/15kΩ,10˚C[50˚F]/9.6kΩ,20˚C[68˚F]/6.3kΩ,25˚C[77˚F]/5.4kΩ, 30˚C[86˚F]/4.3kΩ,40˚C[104˚F]/3.0kΩ		
Liquid pipe thermistor	TH22	Resistance 0˚C[32˚F]/15kΩ,10˚C[50˚F]/9.6kΩ,20˚C[68˚F]/6.3kΩ,25˚C[77˚F]/5.4kΩ, 30˚C[86˚F]/4.3kΩ,40˚C[104˚F]/3.0kΩ		
Gas pipe thermistor	TH23	Resistance 0˚C[32˚F]/15kΩ,10˚C[50˚F]/9.6kΩ,20˚C[68˚F]/6.3kΩ,25˚C[77˚F]/5.4kΩ, 30˚C[86˚F]/4.3kΩ,40˚C[104˚F]/3.0kΩ		
Fuse (Indoor controller board)	FUSE	250V 6.3A		
Fan motor (with Inner-thermostat)	MF1,2	4-pole Output 23W CRC4417BB		4-pole Output 32W CRC4418BB
Inner-thermostat (Fan motor)		OFF 135˚C±5˚C[275˚F±41˚F] ON 95˚C±15˚C[203˚F±59˚F]		
Fan motor capacitor	C1	1.7μF×440V		2.5μF×440V
Linear expansion valve	LEV	DC12V Stepping motor drive port dimension ø3.2 (0~1800pulse <at R410A outdoor unit>, 0~2000pulse <at the other outdoor unit>)		
Power supply terminal bed	TB2	(L1,L2,G) 330V 30A		
Transmission terminal bed	TB5 TB15	(1,2),(M1,M2,S) 300V 10A		

4 OUTLINES AND DIMENSIONS

PEFY-P06·08·12NMLU-E

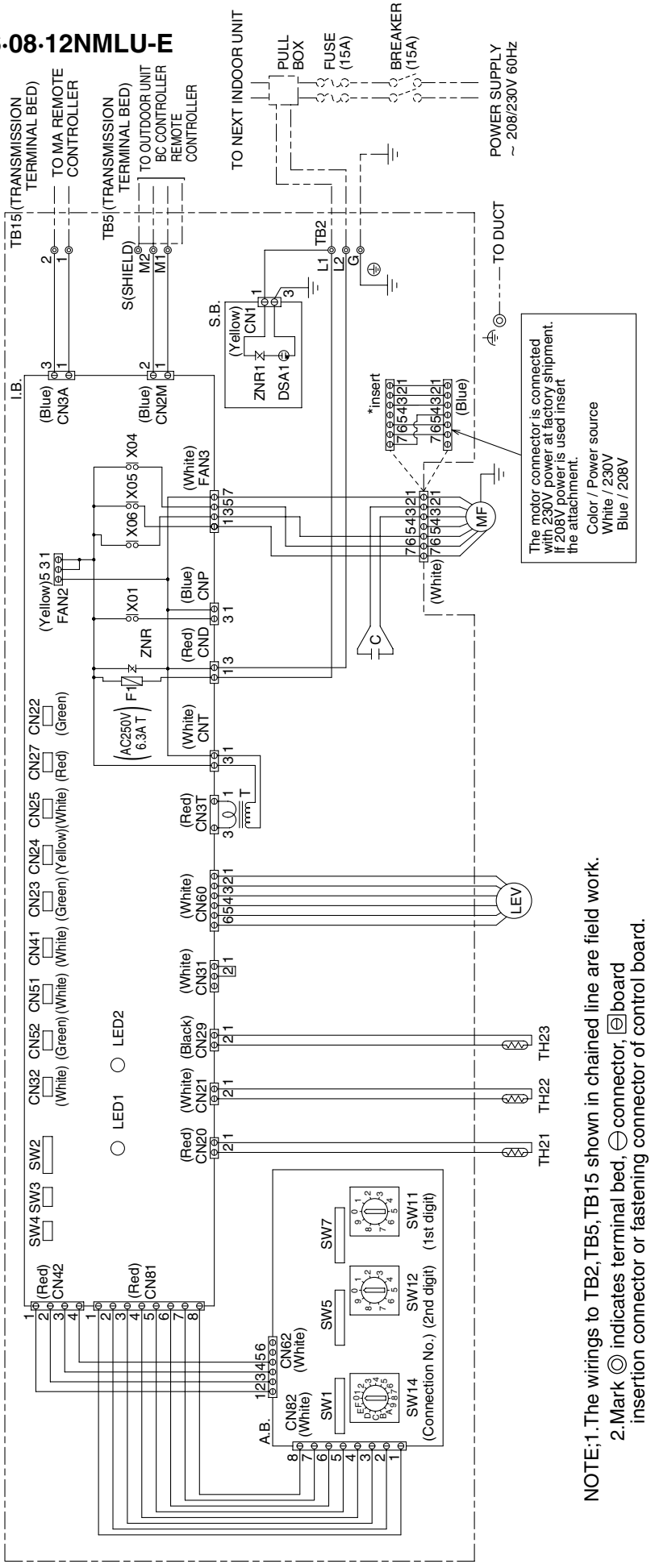
Unit :mm(in.)

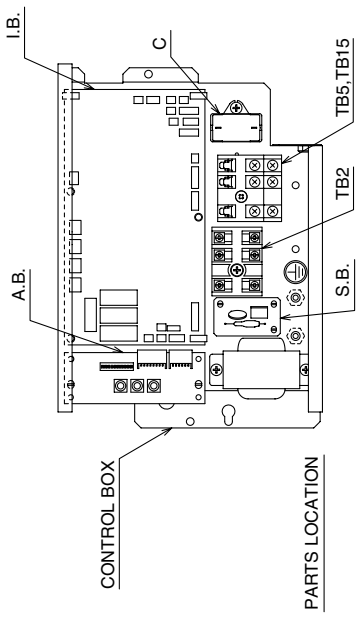

Note1.Use M10 screw for the Suspension bolt (field supply).
2.Keep the service space for the maintenance from the bottom when the heat exchanger is cleaned.
3.The direction of air intake can be changed from the bottom to the rear by attaching the bottom plate to the air intake side.
4.Drain Pan is changeable from right and left.
5.The dimension is changed, in case the optional long-life filter is attached.
Rear Air-Intake spec.:Depth 571mm (22-1/2 in.)(※ 1)
Bottom Air-Intake spec.:Height 241mm (9-1/2 in.)(※ 2)
Detailed chart around the air intake duct frange.(※ 3)
(Duct and frange should be supplied in the field.)
Required space for service and maintenance.
20(13/16) or more
Ceiling surface
Access door
Make the access door at the appointed position properly for service maintenance.



5 WIRING DIAGRAM

PEFY-P06·08·12NMLU-E



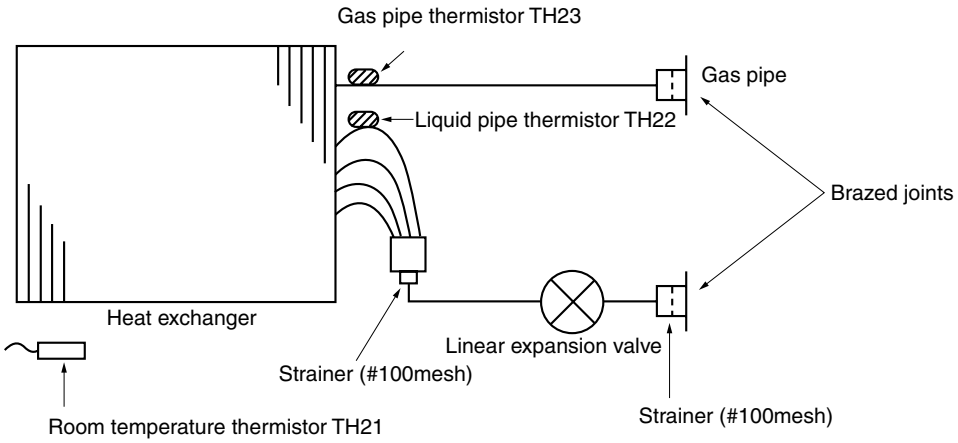


NOTE;1.The wirings to TB2,TB5,TB15 shown in chained line are field work.
2.Mark ◎ indicates terminal bed, ⊖connector, ⊟board
insertion connector or fastening connector of control board.

SYMBOL EXPLANATION

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
MF	Fan motor	LED1	Power supply (I.B.)	TH21	Thermistor (inlet temp.detection)
C	Capacitor (for MF)	LED2	Power supply (Remote controller)	TH22	Thermistor (piping temp.detection/liquid)
I.B.	Indoor controller board	CN22	Connector	TH23	Thermistor (piping temp.detection/gas)
A.B.	Address board	CN23	Connector	SW11(A.B.)	Switch (1st digit address set)
TB2	Power source terminal bed	CN24	Connector	SW12(A.B.)	Switch (2nd digit address set)
TB5	Transmission terminal bed	CN25	Connector	SW14(A.B.)	Switch (connection No.set)
TB15	Transmission terminal bed	CN27	Connector	SW1(A.B.)	Switch(for mode selection)
F1	Fuse AC250V 6.3A T	CN32	Connector (Centrally control)	SW5(A.B.)	Switch(for voltage selection)
T	Transformer	CN41	Connector (HA terminal-A)	SW7(A.B.)	Switch(for model selection)
LEV	Electronic linear expan. valve	CN51	Connector (Centrally control)	SW2(I.B.)	Switch(for capacity code)
S.B.	Surge absorber board	CN52	Connector (Remote indication)	SW3(I.B.)	Switch(for mode selection)
X01,X04-X06	Aux.relay	ZNR,ZNR1	Varistor	SW4(I.B.)	Switch(for model selection)

6 REFRIGERANT SYSTEM DIAGRAM

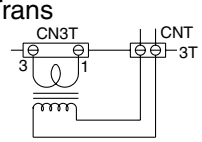
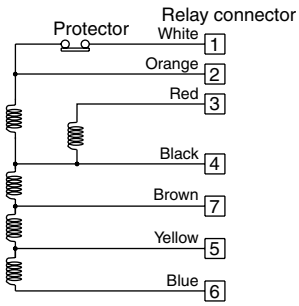
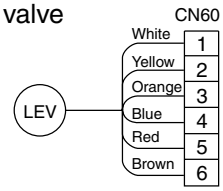
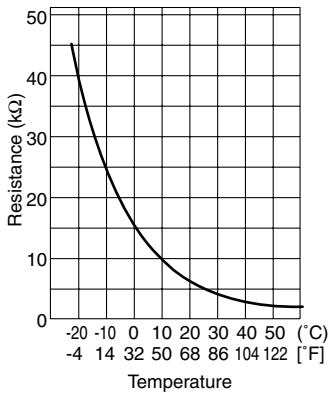


mm <in.>

Item \ Capacity	PEFY-P06·08·12NMLU-E
Gas pipe	ø12.7<1/2>
Liquid pipe	ø6.35<1/4>

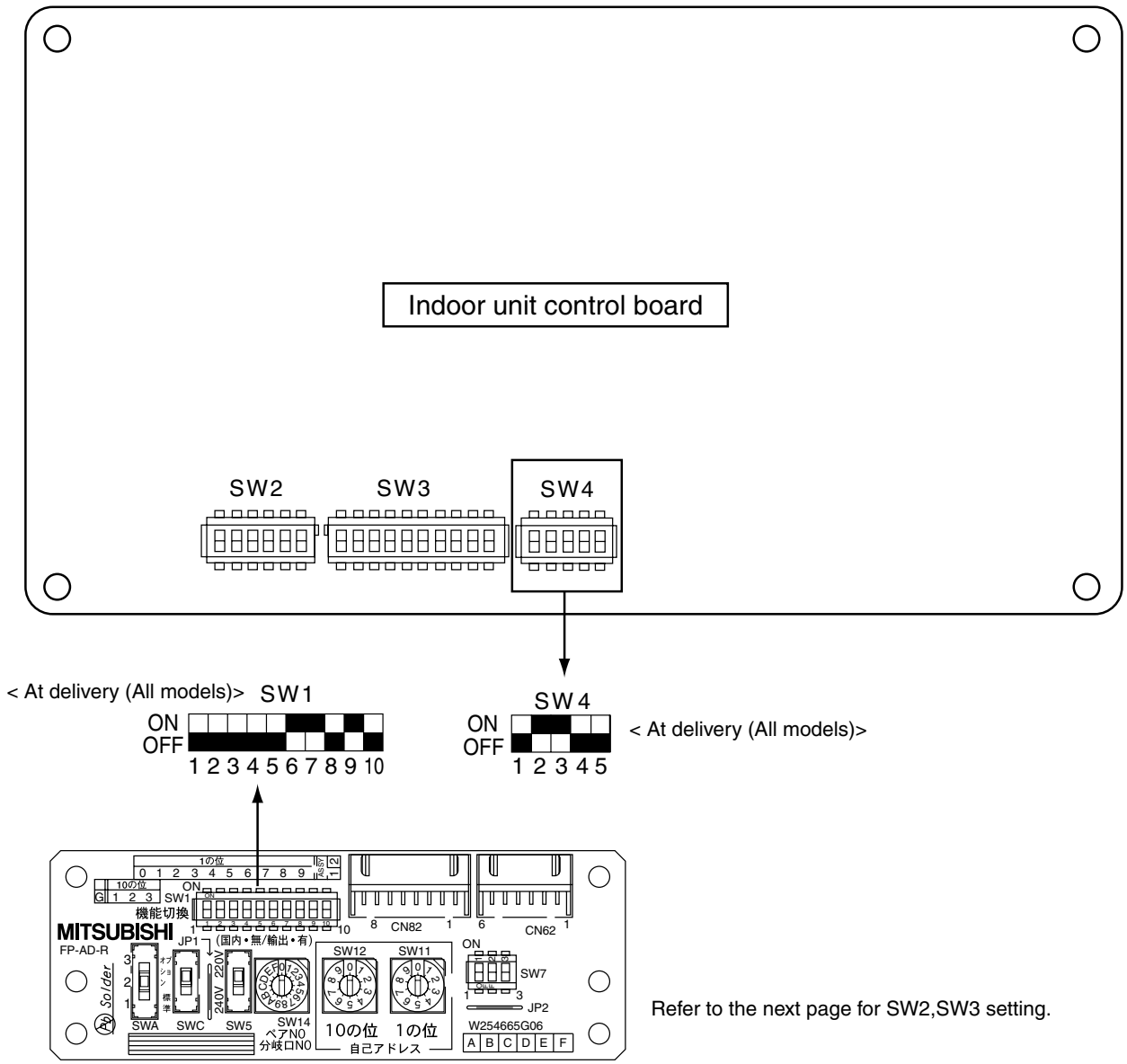
7 TROUBLE SHOOTING

7-1. How to check the parts

<table>
<tr><th>Parts name</th><th>Check points</th></tr>
<tr><td>Room temperature thermistor (TH21)
Liquid pipe thermistor (TH22)
Gas pipe thermistor (TH23)</td><td>Disconnect the connector, then measure the resistance using a tester.
(Sorrounding temperature 10°C~30°C[50°F~86°F])
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>4.3kΩ~9.6kΩ</td><td>Open or short</td></tr></table>(Refer to the thermistor characteristic graph)</td></tr>
<tr><td>Trans
 
</td><td>Disconnect the connector and measure the resistance using a tester.
<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>CNT(1)-(3)</td><td>App.15Ω</td><td rowspan="2">Open or short</td></tr><tr><td>CN3T(1)-(3)</td><td>App.4Ω</td></tr></table></td></tr>
<tr><td>Fan motor PEFY-P06·08·12
 
</td><td>Measure the resistance between the terminals using a tester. (at 20˚C[68°F])
<table><tr><th rowspan="2">Motor terminal
or
Relay connector</th><th colspan="2">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th>P06· 08</th><th>P12</th></tr><tr><td>White-Black</td><td>261 Ω</td><td>232 Ω</td><td rowspan="4">Open or short</td></tr><tr><td>White-Brown</td><td>294 Ω</td><td>259 Ω</td></tr><tr><td>White-Yellow</td><td>389 Ω</td><td>450 Ω</td></tr><tr><td>White-Blue</td><td>475 Ω</td><td>536 Ω</td></tr></table></td></tr>
<tr><td>Linear expansion valve
 
</td><td>Disconnect the connector then measure the resistance valve using a tester.
<table><tr><th colspan="4">Normal</th><th>Abnormal</th></tr><tr><td>(1)-(5)
White-Red</td><td>(2)-(6)
Yellow-Brown</td><td>(3)-(5)
Orange-Red</td><td>(4)-(6)
Blue-Brown</td><td rowspan="2">Open or short</td></tr><tr><td colspan="4">150Ω ±10%</td></tr></table></td></tr>
<tr><td></td><td><Thermistor characteristic graph>
Room temperature thermistor(TH21)
Liquid pipe thermistor(TH22)
Gas pipe temperature thermistor(TH23)
Drain sensor(DS)
Thermistor R_0=15kΩ ± 3%
Fixed number of B=3480kΩ ± 2%
$Rt=15\exp\{3480(\frac{1}{273+t}-\frac{1}{273})\}$
0˚C 32˚F 15kΩ
10˚C 50˚F 9.6kΩ
20˚C 68˚F 6.3kΩ
25˚C 77˚F 5.2kΩ
30˚C 86˚F 4.3kΩ
40˚C 104˚F 3.0kΩ
 
</td></tr>
</table>

7-2. Setting of address switch

Make sure that power source is turning off.



Refer to the next page for SW2,SW3 setting.

1)In case using M-NET remote controller, address is set by rotary switches.(SW11,SW12)

* It is not necessary setting address in case of using unit remote controller.

Indoor unit do not run without address setting in field.

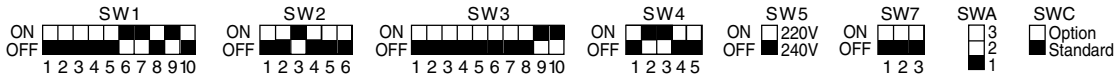
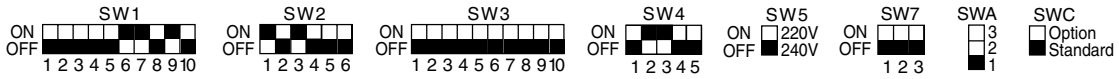
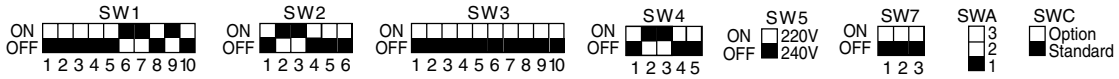
2) Indoor unit address setting rule is different by each field work.
Refer to install manual of outdoor unit , operate the address setting.

3)Setting the address is combination of SW11(1st digit address setting) and SW12(2nd digit address setting).

Address " 3 " setting is composed SW11 " 3 " and SW12 " 0 " .

Address " 25 " setting is composed SW11 " 5 " and SW12 " 2 " .

7-3. Setting of Dip-switch (at delivery)

Models	Dip-SW
PEFY-P06NMLU-E	
PEFY-P08NMLU-E	
PEFY-P12NMLU-E	

7-4. Function the LED of the indoor unit service board

Symbol	LED operation under normal state
LED1	At applying main power source → Lighting
LED2	At receiving MA transmission power source → Lighting

8 DISASSEMBLY PROCEDURE

8-1. CONTROL BOX

Be careful on removing heavy parts.

OPERATING PROCEDURE	PHOTOS

1.Removing the control box cover

(1) Remove the fixing screws (two) of the control box (A), and remove the cover. (Fig. 1)

*At this stage, the following servicing is possible.

1 Operation and check of the switches (listed below) which are on the control board.
- Dip switch SW2 ····· Capacity code setting
- Dip switch SW3 ····· Function change
- Dip switch SW4 ····· Model code setting

2 Operation and check of the switches (listed below) which are on the adress board.
- Rotary switches SW11, 12····· Address setting
- Rotary switch SW14 ····· Branch port setting
- Dip switch SW1····· Function change (main)

3 Connection check of the lead wires (listed below) which are connected to the controller board.
- Power supply lead wire.
- Network remote contoller transmission lead wire.
- Fan motor lead wire.
- LEV lead wire
- Intake air sensor lead wire
- Liquid piping sensor lead wire
- Gas piping sensor lead wire
- Power supply transformer lead wire
- Address board lead wire

4 Control board exchange

5 Address board exchange

6 Condenser exchange

7 Power supply transformer exchange

8 Arrest exchange

9 Intake air sensor exchange

10 Power supply terminal bed exchange

11 Transmission terminal bed exchange

fig.1

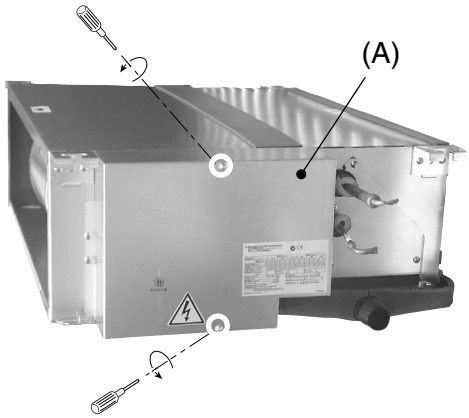
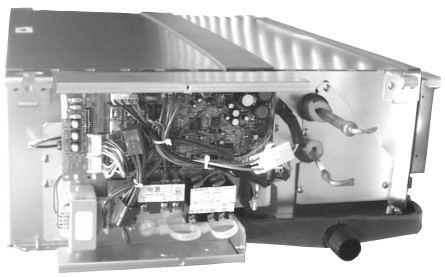


fig.2



8-2. FAN and FAN MOTOR

Be careful on removing heavy parts.

OPERATING PROCEDURE

1.Removing the fan casing and sirocco fan.

(1) Remove the bottom plate 1. (fixing screws : six) (Fig. 3)

(2) Remove the fixing screws (three) of the fan casing, and turn it in direction of arrow. (Fig. 4)

(3) Remove the fixing screws (two) of the fan casing, and loosen the set screw of the sirocco fan, and remove the fan casing and sirocco fan. (Fig. 5)

2.Removing the fan motor.

(1) Remove the control box. (fixing screws : three) (Fig. 7)

(2) Move the control box to place that is not block operation. (Fig. 8)

(3) Remove the fan motor cable connector in the control box, and remove the screws of the motor support. (Fig. 9)

PHOTOS

fig.3

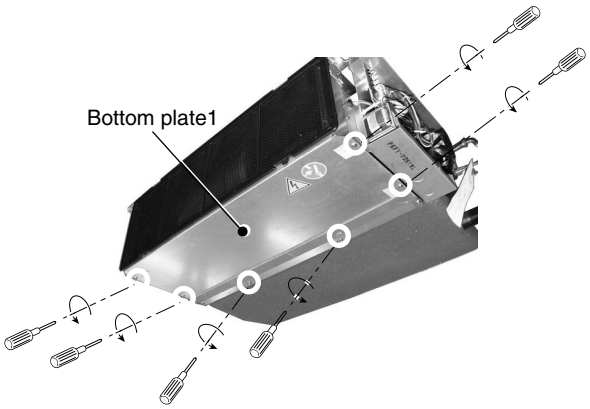


fig.4

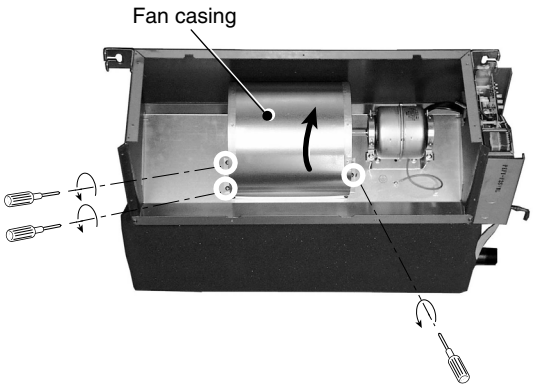


fig.5

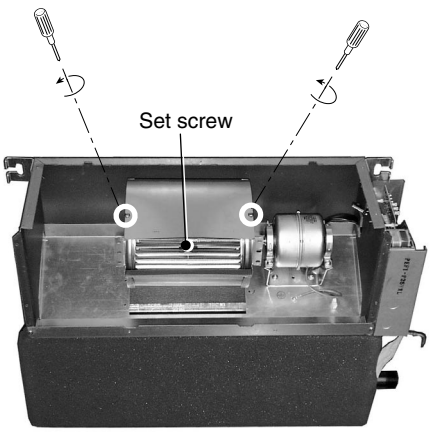


fig.6

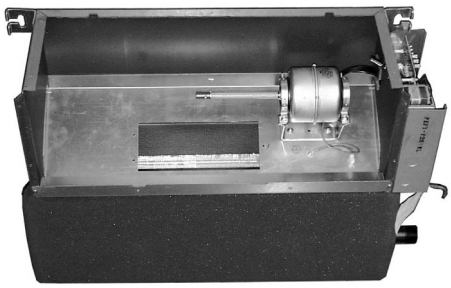


fig.7

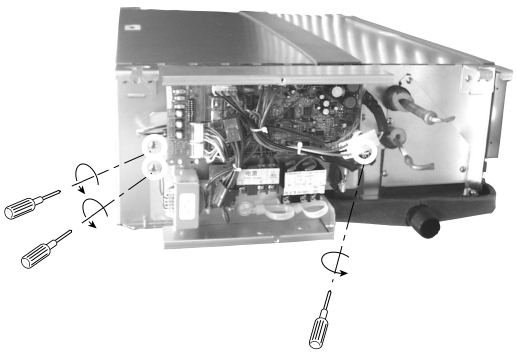


fig.8

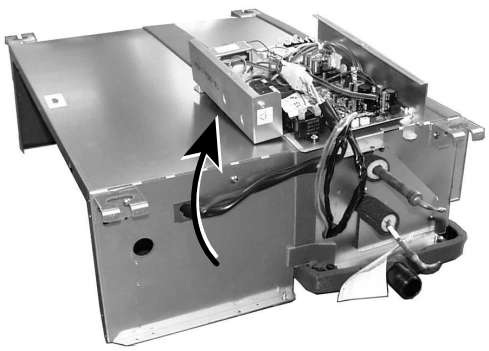
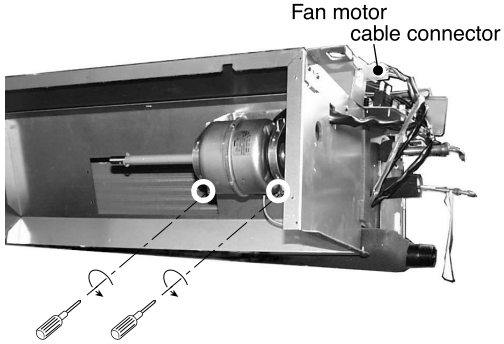
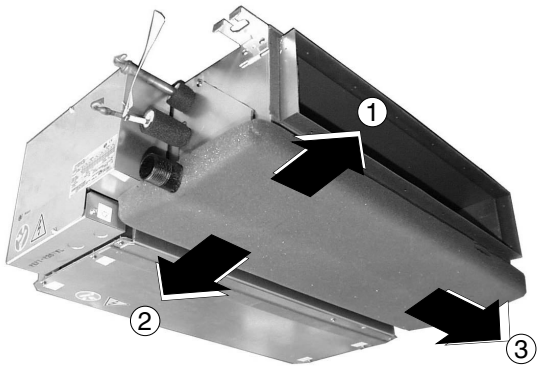


fig.9



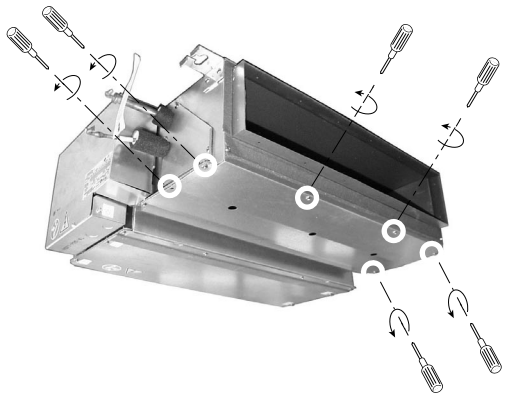
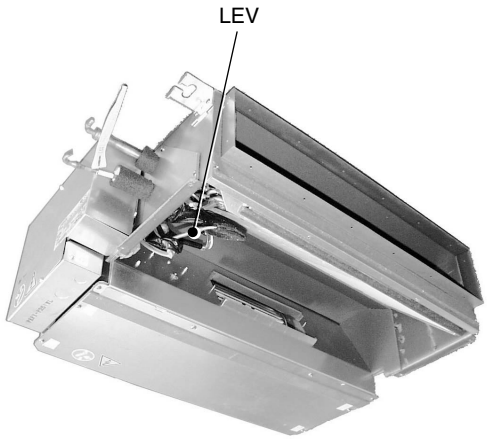
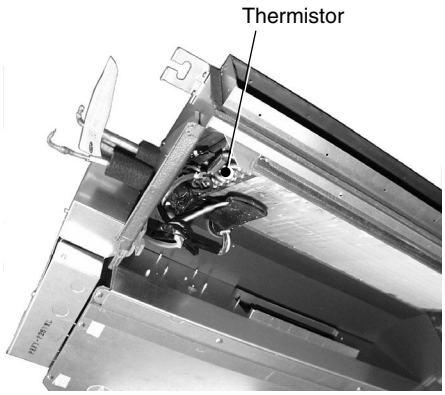
8-3. DRAINPAN

Be careful on removing heavy parts.

OPERATING PROCEDURE	PHOTOS
1.Removing the drainpan. (1) Remove the fixing screw (one) of the drainpan.(Fig. 10). (2) Slide the drainpan in the order of arrow ①,②,③, and remove the drainpan. (Fig. 11)	**fig.10** **fig.11** 

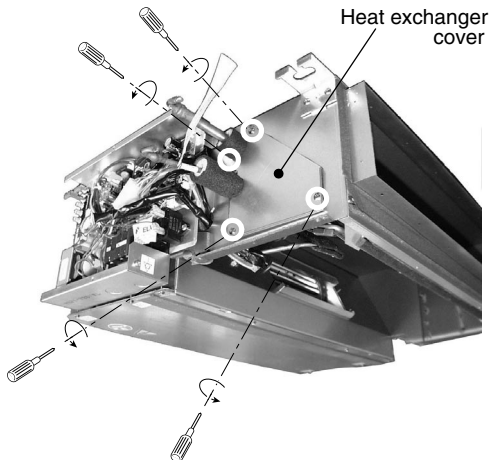
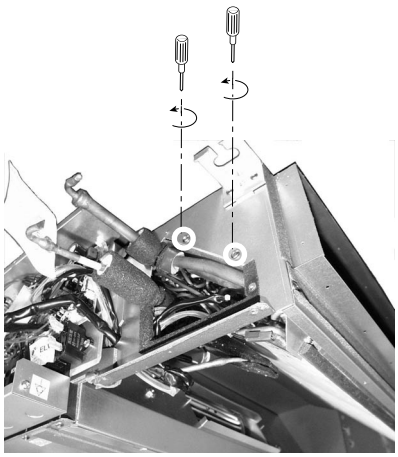
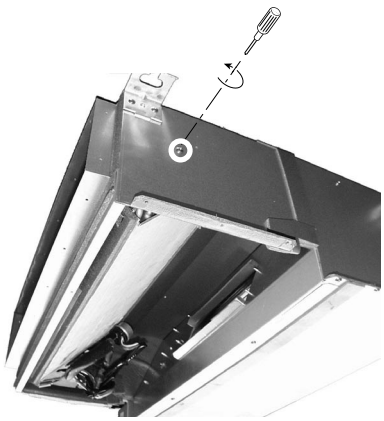
8-4. LEV,THERMISTOR (Liquid/Gas piping temperature detection)

Be careful on removing heavy parts.

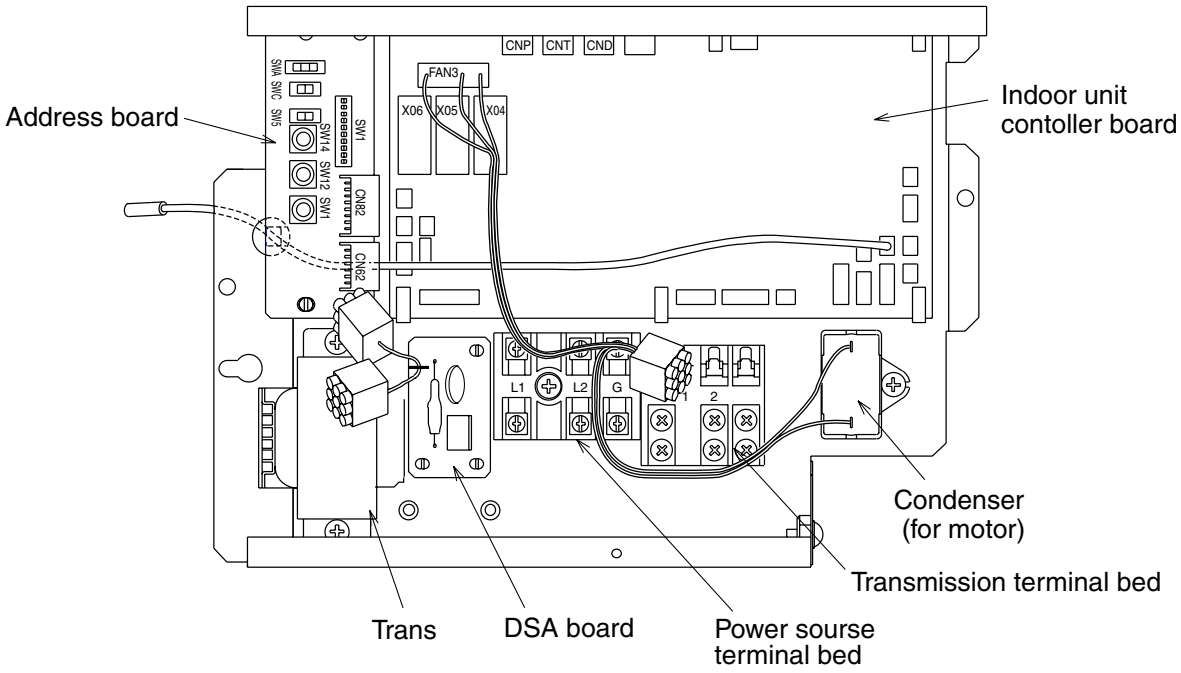
OPERATING PROCEDURE	PHOTOS
1.Removing the LEV. (1) Remove the drainpan with procedure 8-3. (2) Remove the bottom plate 2 (fixing screws : six), and remove the plate.(Fig. 12) (3) Remove the LEV driving motor with a double spanner. (Fig.13) **2.Removing the thermistors.** (1) Remove the thermistors from the thermistor holders which are installed on the piping.(Fig. 14) (liquid piping : fine piping , gas piping : thick piping)	**fig.12**  **fig.13**  **fig.14** 

8-5. HEAT EXCHANGER

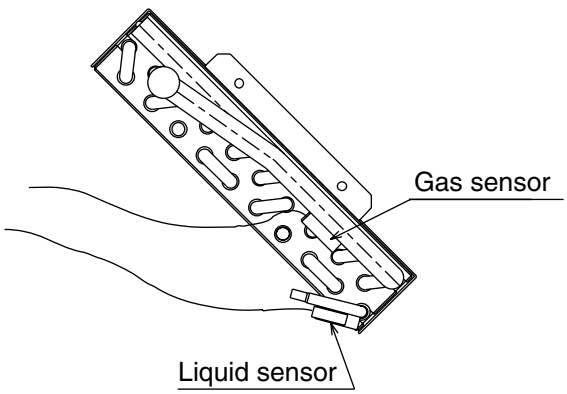
Be careful on removing heavy parts.

OPERATING PROCEDURE	PHOTOS
1.Removing the heat exchanger. (1) Remove the drainpan with procedure 8-3. (2) Remove the bottom plate2 with procedure 8-4. (3) Remove the heat exchanger cover.(fixing screws : four) (Fig. 15) (4) Remove the heat exchanger.(fixing screws : three) (Fig. 16),(Fig. 17)	**fig.15**  **fig16**  **fig.17** 

8-6. CONTROL BOX INSIDE LAYOUT



8-7. SENSOR POSITION



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